

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims

Claims 1-21 (cancelled)

Claim 22 (new): A device for the generation of hydrogen, comprising:

- a. a heated steam reformation stage with a reformer catalyst for converting gaseous or vaporizable hydrocarbons and water into hydrogen, carbon monoxide and further reformation products, wherein the steam reformation stage is embodied as a hollow body, with a shell chamber embodied as an annular chamber for housing a reformer catalyst, and a heating device that is arranged in the shell chamber;
- b. at least one stage that is arranged downstream of the steam reformation stage for catalytic conversion of the mixture of hydrogen, carbon monoxide, and excess water steam (shift step) emanating from the steam reformation stage, wherein the conversion stages are embodied as a hollow body with an annular chamber for housing a corresponding catalyst; and
- c. a fine purification stage that is arranged downstream of the conversion stages for catalytic reduction of the residual carbon monoxide content of the conversion products, wherein the fine purification stage is embodied as a hollow body with an annular chamber for housing the corresponding catalyst, and wherein the annular chamber of the fine purification stage directly connects to the annular chamber of the conversion stage on the fine purification stage side,

wherein the annular chamber of the conversion stage on the steam reformation stage side directly connects to the annular chamber of the steam reformation stage to form a complete annular chamber of all the stages.

Claim 23 (new): The device according to claim 22, wherein the heating device is embodied as a burner.

Claim 24 (new): The device according to claim 22, wherein the cross sectional thickness of the complete annular chamber is approximately 2 to 20 % of the exterior diameter of the hollow body.

Claim 25 (new): The device according to claim 22, wherein the catalyst is arranged in at least one of the annular chambers in a honeycomb structure, preferably arranged on a flow channel limiting corrugated metal foil.

Claim 26 (new): The device according to claim 25, wherein perforations are provided between the flow channels for improving the material exchange.

Claim 27 (new): The device according to claim 22, wherein at least one flow channel is provided in the interior of the hollow body (bodies).

Claim 28 (new): The device according to claim 22, wherein the main direction of flow of hydrogen and of the reformer products within the hollow body is preferably essentially oriented parallel to its axis.

Claim 29 (new): The device according to claim 28, wherein the flow channel represents an annular chamber.

Claim 30 (new): The device according to claim 28, wherein the flow channel is embodied for feeding and preheating the hydrocarbons in the opposite direction of the flow of the gaseous products coming from the conversion stages and the fine purification stage.

Claim 31 (new): The device according to claim 22, wherein an indirect heat exchanger is provided at least between the conversion stages and the steam reformation stage, and possibly also between the conversion stage and the fine purification stage, through which the water required for the steam reformation is guided in counter flow of the gaseous products coming from the conversion stages and possibly also from the fine purification stage.

Claim 32 (new): The device according to claim 22, wherein the fine purification stage is embodied optionally as a selective oxidation stage (SelOx stage), or as a methanation stage.

Claim 33 (new): The device according to claim 32, wherein the SelOx stage is equipped with an air supply that is evenly arranged across the circumference of the annular chamber of the fine purification stage.

Claim 34 (new): The device according to claim 33, wherein the air supply is embodied as an annular manifold with distributed discharge nozzles.

Claim 35 (new): The device according to claim 22, wherein a flow guide enclosure that envelopes the conversion stages from the exterior, for a cooling medium for the cooling of the conversion stages, wherein the cooling medium preferably is water or hydrocarbons, which can be fed to the steam reformation stage in the form of steam.

Claim 36 (new): The device according to claim 35, wherein the flow guide enclosure contains input and output connections for the cooling medium, and is optionally designed in the equal or counter flow of the through flow direction within the conversion stages.

Claim 37 (new): The device according to claim 35, wherein the flow guide enclosure is hydraulically connected on the discharge connection side to the reformation stage on the educt input side.

Claim 38 (new): The device according to claim 35, wherein a control valve is provided as an option at the input and/or output connections of the flow guide enclosure for the mass adjustment of the flow of the cooling medium.

Claim 39 (new): The device according to claim 22, wherein at least one temperature sensor is arranged at the downstream end of the annular chamber of the conversion stages, which is connected to the control valve for the mass adjustment of the flow of the cooling medium via an upstream control unit.

Claim 40 (new): The device according to claim 22, wherein an additional cooling medium channel is arranged in the interior of the hollow cylindrically embodied conversion stages, through which preferably and optionally water and/or the hydrocarbons can flow.